Original Article

Is self-harm among orthodontic patients related to dislike of dentofacial features and oral health-related quality of life?

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ABSTRACT

Objectives: To investigate the relationship between self-reported self-harm and dislike of dentofacial features and oral health-related quality of life (OHRQoL).

Materials and Methods: Anonymous, self-reporting questionnaires were completed by 699 school children (aged 13–14 years), representing over 1% of the age group in Amman, Jordan. Participants were invited from 23 randomly selected schools in 10 educational directorates. OHRQoL was assessed using the Child Perception Questionnaire (CPQ 11–14). Self-harm was assessed using a constructed self-reporting questionnaire. The relationship between OHRQoL and self-harm was assessed and significant findings were identified at probability of $\alpha = 0.05$.

Results: Over one-quarter of schoolchildren (26.9%, n = 88) admitted self-harming behavior. Self-harm was reported to be due to dislike of dentofacial appearance among 12.9% of participants (n = 90). Higher CPQ 11–14 total scores and individual dimension scores were associated with the presence of self-harm ($P < .001$). High self-harm incidence was reported among participants who had dentofacial features that affected appearance ($P < .001$). Among subjects admitting self-harm, the frequency of self-harming behavior ranged from once to over 10 times per year.

Conclusions: Significant relationships were found between self-harm and dislike of dentofacial features and OHRQoL. (*Angle Orthod.* 2022;92:240–246.)

KEY WORDS: Self-harm; Oral health-related quality of life

INTRODUCTION

Self-harm may be defined as any act of self-poisoning or self-injury carried out by an individual irrespective of motivation.[1] Relatively little is known about the etiology and characteristics of children and adolescents, particularly under the age of 15 years, engaging in such behavior. Even less is known regarding the effects of bullying, particularly related to dentofacial features, and self-harm in 13- to 14-year-old school children.[2] A relatively high experience of this phenomenon has been reported by adolescent school children, with many reporting self-harm as a result of their dentofacial appearance and bullying due to dentofacial features.[3]

Researchers have found that attractive dental appearance is of great importance to adolescents[4] and that dentofacial esthetics represents an important factor in self-esteem.[5] Several investigations have found an association between negative body attitudes, body image and dissatisfaction, and self-harm.[6–8] Researchers have also found that adolescents who show disregard for their body may be more prone to engaging in self-harm when faced with "aversive, overwhelming emotional states."[9]

Oral health-related quality of life (OHRQoL) is defined as the absence of negative effects of oral conditions on social life and a positive sense of dentofacial self-confidence.[10] Systematic reviews have shown that malocclusion has a negative impact on

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OHRQoL, which usually increases with the severity of the malocclusion.[11–13]

A positive association between self-harm and bullying victimization was reported in adolescents.[14] Among self-harmed children in the UK, 66% were victims of bullying.[15] In Jordan, previous work has shown that 47% of 11- to 12-year-old children reported being bullied, with the most common targeted feature being the teeth.[16]

The aim of this investigation was to investigate the potential relationship between self-reported self-harm due to dentofacial features and OHRQoL.

MATERIALS AND METHODS

Ethical approval for the study was obtained from the Research and Ethics Committee at the University of Jordan. The Ministry of Education in Jordan gave approval to carry out the study in schools in the capital.

This was a cross-sectional, observational study involving a representative sample of 8th grade schoolchildren (13 to 14 years old) in Amman. A total of 851 school children were invited to participate in the study. Twenty-three schools randomly selected from a list of all schools in the 10 educational directorates in Amman were asked to participate.

The Child and Adolescent Self-harm in Europe (CASE) questionnaire[17] was used in the present study. The questionnaire was anonymous and self-harm was recorded if school children answered "yes" to the following question:[17] "Have you ever hurt yourself on purpose in any way?" The frequency of self-harm during the last year was assessed by asking the participants to identify how many times they harmed themselves during the last year.

Questions to assess the link between self-harm and dentofacial features that affect appearance were modified from the questionnaire used by Al-Bitar et al.[3] It included questions about possible contribution of various dentofacial features that affect the appearance to self-reported self-harm.[16] The dentofacial features were proclined upper anterior teeth, proclined lower anterior teeth, forward chin position, crooked teeth, tooth shape or color, presence of a gap between the teeth or having missing teeth, anterior open bite, gummy smile, incompetent lips, wearing fixed orthodontic appliances, and wearing removable orthodontic appliances.

The short version of the Arabic Child Perception Questionnaire (CPQ) was used for assessing oral health-related quality of life in 11- to 14-year-olds (CPQ 11–14).[15–18] The original questionnaire was developed by Jocovic et al[19] and is divided into four health domains: oral symptoms, functional limitations, emotional well-being, and social well-being.

School principals were contacted to obtain approval for their school to participate in the study. Consent letters were sent to all parents who had children in the eighth grade. The consent form explained the nature and goals of the study. All eighth-grade school children who agreed to participate were included in the study. The questionnaire was distributed in the classroom in the presence of teachers, but the children completed the questionnaires with no assistance. One of the researchers was available to clarify any items in the questionnaire that were not clear to participants. Any questionnaire that was not completed correctly was excluded from further analysis.

Statistical Analysis

Statistical Package for Social Sciences computer software (IBM SPSS Statistics v19; IBM Corp, Armonk, NY, USA) was used for statistical analyses. A Kolmogorov-Smirnov test showed that the data were not normally distributed. Chi square test was used to identify associations between different self-harm and OHRQoL variables. The Mann-Whitney *U* test was used to identify differences between groups according to gender, presence of self-harm, and presence of dentofacial features that affected appearance. Alpha (α) $\leq$ 0.05 was regarded as significant.

Hierarchical logistic regression analysis was used to assess the odds of the presence of self-harm in relation to OHRQoL and CPQ scores. Confounding effects of gender, school directorate, being from private or public school, and having dentofacial features that affected appearance were evaluated in the regression models.

According to Hanania et al.,[20] the self-harm prevalence was 22.6% among a population of 11- to 19-year-old adolescents in Amman, Jordan. Therefore, this was used as the proportion of the population (effect size) during the sample size estimation for this study. The sample size for this study was then calculated using computer software (G*Power, version 3.1.9.7; Heinrich-Heine University, Düsseldorf, Germany). A priori power analysis using logistic regression test showed that a total sample size of 662 participants was required to obtain an effect size of 22.6%, a two-tailed significance level (α) of .05, a Z score of 1.96 for 95% confidence intervals, an odds ratio of 1.3, and a study power ($1 - \beta$) of 80%. Extra participants were invited and recruited to compensate for possible dropouts or incomplete answers

RESULTS

Of the 851 students approached to participate in the study, the parents of 85 (9.9%) children declined their participation in the study and 67 questionnaires were

Table 1. Descriptive Statistics of Oral Health Related Quality of Life and Frequency of Self-Harm Among the Study Sample[a]

	All Participants (n = 699)			Participants With Self-Harm (n = 188)			Participants With no Self-Harm (n = 511)		
	Median	IQR	Range	Median	IQR	Range	Median	IQR	Range
Total CPQ Score	14	16	0–59	19	18	0–59	12	15	0–59
Oral Symptoms score	5	5	0–16	6.5	5	0–14	5	4	0–16
Functional Limitations score	3	5	0–16	5	6	0–16	2	6	0–16
Emotional Wellbeing score	4	7	0–16	5	7	0–16	3	5	0–16
Social Wellbeing score	1	3	0–16	2	6	0–16	0	3	0–16
Global rating of child's oral health score	2	2	0–4	2	2	0–4	2	1	0–4
Effects of oral condition on overall wellbeing score	1	1	0–4	2	2	0–4	1	1	0–4

[a] CPQ indicates Child Perception Questionnaire; IQR, interquartile range.

incomplete and thereby excluded. The final sample comprised 699 students (339 girls and 360 boys), representing 82% of the invited students and 1.26% of all eighth grade students in Amman.

Self-harm was reported by 26.9% (99 males and 89 females) of participants ($P < .001$). Dentofacial features that affected appearance were identified by 12.9% (46 males and 44 females) of participants as being the main reason for self-harming behavior ($P < .001$). Frequency of reported self-harm in the previous year was as follows: 80 participants (42.6%) harmed themselves once, 57 (30.3%) harmed themselves 2–5 times, 23 (12.2%) harmed themselves 6–10 times, and 28 (14.9%) harmed themselves more than 10 times.

Table 1 illustrates descriptive statistics of oral health-related quality of life and frequency of self-harm among the study sample. The total CPQ scores ranged from 0 to 59 (mean score ± SD: 16.19 ± 11.54, median = 14) (Table 1). Statistical analyses using Mann-Whitney *U*-test showed no significant gender differences for all measured variables ($P > .05$). Among the participants who reported self-harm, the total CPQ scores ranged from zero to 59 (mean score ± SD: 20.71 ± 12.70, median = 19) (Table 1). Statistical analyses using Mann-Whitney *U*-test showed no significant gender differences ($P > .05$) except that males reported higher oral symptom CPQ scores ($P = .001$) and higher social well-being scores ($P = .039$) than females. Among participants who did not report self-harm, the total CPQ scores ranged from 0 to 59 (mean score ± SD: 14.53 ± 10.62, median = 12) (Table 1). Statistical analyses using Mann-Whitney *U*-test showed no significant gender differences ($P > .05$) except that females reported higher effects of oral condition on overall well-being ($P = .038$) than males.

The participants who reported self-harm scored higher total CPQ scores, CPQ individual dimension scores, global oral health ratings, and effects of oral condition on overall well-being (ie, signifying a worse impact on OHRQoL) than the participants who reported no self-harm ($P < .001$, Table 2). The frequency of self-harm was not related to the total CPQ scores, CPQ individual dimension scores, global oral health ratings, or the effects of oral condition on overall well-being ($P > .05$, Table 3).

High self-harm incidence was reported among participants who had dentofacial features that affected their appearance ($P < .001$). The presence of dentofacial features that affected appearance was associated with higher total CPQ scores, CPQ individual dimension scores, global oral health ratings,

Table 2. Differences in Oral Health Related Quality of Life Between Participants who Reported Self-Harm (n = 188) and Participants who did not Report Self-Harm (n = 511) in the Study Sample ($n_{Total} = 699$)[a]

Variables	M-W U	Z	*P*
Total CPQ Score	33724.500	-6.048	<.001
Oral Symptoms score	37550.000	-4.446	<.001
Functional Limitations score	35840.500	-5.198	<.001
Emotional Wellbeing score	36152.500	-5.051	<.001
Social Wellbeing score	37516.500	-4.728	<.001
Global rating of child's oral health score	36704.500	-4.953	<.001
Effects of oral condition on overall wellbeing score	39254.000	-3.815	<.001

[a] CPQ indicates Child Perception Questionnaire; M-W U, Mann-Whitney *U*-test coefficient; Z, Z statistics using Mann-Whitney *U*-test; *P*, 2-tailed probability value.

Table 3. Relationship Between Oral Health Related Quality of Life and Frequency of Self-Harm Among Study Sample who Reported Self-Harm (n = 188)[a]

	Frequency of Self-Harm		
Variables	X^2	df	*P*
Total CPQ Score	195.897	192	.408
Oral Symptoms score	64.817	56	.196
Functional Limitations score	53.168	64	.831
Emotional Wellbeing score	57.143	64	.716
Social Wellbeing score	52.267	64	.853
Global rating of child's oral health score	20.208	16	.207
Effects of oral condition on overall wellbeing score	13.254	16	.654

[a] CPQ indicates Child Perception Questionnaire; X^2, Chi square test coefficient; df, degree of freedom; *P*, 2-tailed probability value.

Table 4. Differences in Oral Health Related Quality of Life Between Participants who had Dentofacial Features That Affected Appearance (n = 90) and Participants who did not Have Such Facial Features (n = 609) in the Study Sample ($n_{Total} = 699$)[a]

Variables	M-W U	Z	*P*
Total CPQ Score	15137.000	-6.865	<.001
Oral symptoms score	19918.500	-4.203	<.001
Functional limitations score	17322.500	-5.690	<.001
Emotional wellbeing score	16316.500	-6.241	<.001
Social wellbeing score	17688.500	-5.783	<.001
Global rating of child's oral health score	19333.000	-4.672	<.001
Effects of oral condition on overall wellbeing score	19723.000	-4.419	<.001

[a] CPQ indicates Child Perception Questionnaire; M-W U, Mann-Whitney *U*-test coefficient; Z, Z statistics using Mann-Whitney *U*-test; *P*, 2-tailed probability value.

and effects of oral condition on overall well-being (ie, signifying a worse impact on OHRQoL) ($P < .001$, Table 4). The presence of dentofacial features that affected appearance was not related to the frequency of self-harm ($P = .093$).

Hierarchical logistic regression showed that global ratings of child's oral health, CPQ total scores, and CPQ dimensional scores of oral symptoms, functional limitations, and emotional wellbeing were able to predict and contributed toward the presence of self-harm ($P < .05$, Table 5). Participants who scored higher on these oral health related quality of life parameters would have higher odds of reporting self-harm (Table 5). The covariance and confounding effects of gender, being from private or governmental school, the school district, and having dentofacial features that affected appearance were considered and were not found to have significant effects ($P > .05$).

DISCUSSION

Previous investigators reported associations between dentofacial esthetics and OHRQoL, bullying, self-esteem, body image, and well-being.[16,21–23] However, none investigated the relationship between self-harm, dislike with dentofacial features, and OHRQoL. A total of 188 of 699 school children admitted self-harming behavior from once to 10 times in a 1-year period, and 90 claimed this to be due to dislike of their dentofacial appearance. These findings highlight the potential role that dentofacial features might play in self-harm among adolescents.

Earlier investigations showed that the age of onset of self-harm was 12–14 years.[20,24] Consequently, children in the eighth grade (aged 13–14 years) were selected for this study. A self-reported questionnaire rather than an interview was used in the present study to obtain more open and honest responses, mainly because self-harm is considered a secretive behavior.

Gender variations in reported self-harm among different populations have been contradictory. Some researchers identified a higher tendency for self-harm among females,[25–28] whereas others found no gender differences.[29] In this study, no significant gender differences were found for any investigated parameters.

Significant relationships were found between self-harm and OHRQoL. Worse impacts on OHRQoL were associated with presence of self-harm, higher frequency of self-harm during the previous year, and presence of self-harm due to dentofacial features. Facial features may have negatively impacted OHRQoL, leading to distress that might have caused individuals to inflict self-harm. This might have also been influenced by the psychological impact of poor OHRQoL and dentofacial features.

Reported self-harm prevalence in the current study was 26.9%. This was slightly higher than that previously reported among 11–19 years old adolescents (22.6%) in Jordan.[20] This difference could have been due to differences in age and underlying socioeconomic conditions of tested populations. In addition, the level of self-harm among the population of this investigation was higher than those reported in Scotland (13.8%),[27] Ireland (9.2%),[30] and Japan (9.9%).[31] This variation might be attributed to variations in cultural and ethnic backgrounds, age, socioeconomic status, tested populations, and psychological attributes. Nevertheless, the reported levels of self-harm in this study agreed with a previous cross-national study in Germany and the USA, which reported comparable levels of self-harm (26% and 23%, respectively).[26] In addition, the levels of self-harm among this study population were comparable to those reported by Giletta et al. in Italy (24%), the Netherlands (26%), and the USA (22%).[28]

Over a quarter (26.9%) of 13- to 14-year-old children investigated admitted self-harming behavior, with almost half of this group (12.9%) admitting that the reason was related to their facial appearance. As the study sample was just over 1% of 13- to 14-year-old school children in Amman, extrapolation of the data to the population of the city in this age group would suggest approximately 14,000 children involved in self-harming behavior, 7000 due to concerns with their facial appearance. Even as an approximation, these are distressingly large numbers and warrant application of measures to confront the issue.

This investigation presented baseline data to improve understanding and cast light on the associations between deliberate self-harm, self-perceived dentofacial appearance, and oral health-related quality of life.

Table 5. Prediction of Self-Harm Presence Utilizing the Scores of Different Oral Health Related Quality of Life Variables and Other Covariates Among the Study Population Using the Hierarchical Logistic Regression Analysis (n = 699)[a]

						Exp (B) 95% CI	
Models to Predict Self-harm Using OHRQoL Variables*	B	SE	df	Sig.	Exp (B)	Lower	Upper
Self-harm presence and Global rating of child's oral health (Block 2 Nagelkerke R^2 = .510, Block 2 Hosmer and Lemeshow test probability value [*P*] = .750)							
Gender	.007	.233	1	.978	1.007	.638	1.589
School directorate			9	.036			
Being from private or public school	.919	.529	1	.082	2.507	.889	7.069
Dentofacial appearance	23.030	5598.599	1	.997	1.004E10	.000	.
Global rating of child's oral health	.308	.106	1	.004	1.361	1.105	1.675
Self-harm presence and Effects of oral condition on overall wellbeing (Block 2 Nagelkerke R^2 = .503, Block 2 Hosmer and Lemeshow test probability value [*P*] = .372)							
Gender	-.048	.231	1	.835	.953	.605	1.500
School directorate			9	.048			
Being from private or public school	.947	.529	1	.073	2.579	.914	7.276
Dentofacial appearance	23.045	5632.291	1	.997	1.019E10	.000	.
Effects of oral condition on overall wellbeing	.177	.096	1	.066	1.194	.989	1.442
Self-harm presence and Total CPQ scores (Block 2 Nagelkerke R^2 = .507, Block 2 Hosmer and Lemeshow test probability value [*P*] = .223)							
Gender	-.004	.232	1	.985	.996	.632	1.568
School directorate			9	.041			
Being from private or public school	.867	.525	1	.099	2.379	.850	6.656
Dentofacial appearance	22.948	5614.534	1	.997	9.251E9	.000	.
Total CPQ scores	.027	.010	1	.008	1.028	1.007	1.048
Self-harm presence and CPQ oral symptoms scores (Block 2 Nagelkerke R^2= .505, Block 2 Hosmer and Lemeshow test probability value [*P*] = .847)							
Gender	.000	.232	1	1.000	1.000	.635	1.575
School directorate			9	.066			
Being from private or public school	.768	.525	1	.143	2.156	.771	6.033
Dentofacial appearance	23.031	5615.833	1	.997	1.005E10	.000	.
CPQ oral symptoms scores	.082	.035	1	.020	1.085	1.013	1.162
Self-harm presence and CPQ functional limitations scores (Block 2 Nagelkerke R^2 = .505, Block 2 Hosmer and Lemeshow test probability value [*P*]= .715)							
Gender	-.048	.232	1	.837	.953	.606	1.501
School directorate			9	.048			
Being from private or public school	.881	.525	1	.093	2.414	.862	6.761
Dentofacial appearance	22.977	5624.890	1	.997	9.526E9	.000	.
CPQ functional limitations scores	.075	.032	1	.018	1.078	1.013	1.147
Self-harm presence and CPQ emotional wellbeing scores (Block 2 Nagelkerke R^2 = .504, Block 2 Hosmer and Lemeshow test probability value [*P*] = .657)							
Gender	-.019	.231	1	.936	.982	.624	1.544
School directorate			9	.047			
Being from private or public school	.840	.524	1	.109	2.317	.829	6.474
Dentofacial appearance	22.937	5637.953	1	.997	9.146E9	.000	.
CPQ emotional wellbeing scores	.061	.029	1	.036	1.063	1.004	1.126
Self-harm presence and CPQ social wellbeing scores (Block 2 Nagelkerke R^2 = .501, Block 2 Hosmer and Lemeshow test probability value [*P*] = .505)							
Gender	-.002	.231	1	.994	.998	.634	1.571
School directorate			9	.070			
Being from private or public school	.908	.527	1	.085	2.479	.883	6.961
Dentofacial appearance	22.979	5651.177	1	.997	9.544E9	.000	.
CPQ social wellbeing scores	.051	.033	1	.118	1.052	.987	1.122

[a] B indicates the B coefficient of the model; CI, confidence intervals; df, degree of freedom; Exp (B), exponentiated B coefficients (odds ratio); OHRQoL, oral health-related quality of life; SE, standard error; Sig., significance of 2-tailed probability value (*P*).

* For the hierarchical logistic regression analysis, variables entered in Block 1: Gender, being from private or public school, school directorate, and having dentofacial features. Variables entered in Block 2: Oral health related quality of life variables. For each model, the predicted overall percentage for Block 0 (Beginning Block), Block 1, and Block 2 equals 73.1, 86.0, and 86.0 respectively. Nagelkerke R^2 for Block 1 in every model = .498. Hosmer and Lemeshow test probability value (P) for Block 1 in every model = .882.

There were some limitations to this investigation. The cross-sectional design precluded longitudinal evaluation of the tested parameters. Also, 152 invited students either did not agree to participate or provided incomplete responses, and this might have been caused by sociocultural attributes and sensitivity of this issue. This could have potentially affected the results. However, the response rate was high in this

study and the number of included participants was far more than the estimated sample size required for this investigation. Sociocultural variables in different areas of a large metropolitan city, the size of classrooms, population density in each area, and the educational level of families were all factors that may bear relevance and require further investigation.

CONCLUSIONS

- Over one-quarter of schoolchildren admitted self-harming behavior, which is a worryingly high number.
- Significant relationships were found between self-reported self-harm and OHRQoL.
- Reasons for self-harm were reported to be self-reported dislike of dentofacial appearance in nearly 13% of the children, with no significant gender differences in relation to self-harm and OHRQoL.
- Higher CPQ 11–14 total scores and individual dimension scores, signifying worse impact on OHRQoL, were associated with the presence of self-harm and the presence of dentofacial features that affected appearance.
- Among children admitting self-harm, the frequency of self-harming behavior ranged from once to over 10 times per year and had no significant relationships with CPQ scores or presence of dentofacial features that affect appearance ($P > .05$).
- In summary, significant relationships were found between OHRQoL, deliberate self-harm, and dentofacial features that affect appearance in 13- to 14-year-old school children.

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